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Profitability, Diversification, and Multinationality in Leading German and UK Firms

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Abstract

This paper analyzes the relationship between product and geographic diversification and profitability in leading German and UK firms. Using a unique and disaggregated dataset, we first link a firm's level of product and geographic diversification to both industry and firm-specific factors. The impact of the Single European Market and industry type are found to be important in explaining diversification levels. Secondly, during the early 1990s, we find evidence of a curvilinear relationship between profitability and product diversification for German firms but between profitability and geographic diversification for UK firms. Diversification and multinationality are found to be complementary strategies for German firms but substitute strategies for UK firms.

Key words: profitability; diversification; multinationality

JEL classification: L10; L23

1. Introduction

Few topics in either the industrial organization or strategic management literature are as rich and complex as the relationship between firm performance and diversification across both geographic and product markets. Scholars from various disciplines have investigated these relationships for decades (Palich et al., 2000) but the notable progress to date has been outpaced by the expanded appreciation of the many factors that influence product and geographic expansion. Existing research has argued that industry type (Dess et al., 1990) and R&D expenditures (Hitt et al., 1997) matter critically, and moreover that diversification and multinationality should be

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considered jointly (Tallman and Li, 1996). In addition, recent research has highlighted the importance of national and institutional contexts in shaping the structure of firms (Gedajlovic and Shapiro, 1998; Khanna and Rivkin, 2001; Guillén, 2000). Nevertheless, the vast majority of the investigations into these relationships center on US-based or Japanese multinationals (Rumelt, 1982; Tallman and Li, 1996; Hitt et al., 1997). Also, previous studies have typically examined the relationship between performance and product diversification or between performance and multinationality, but few have considered them in tandem (Hitt et al., 1997; Tallman and Li, 1996; Hennart and Park, 1994; Geringer et al., 2000).

Thus, our first objective is to add much needed diversity to the debate by considering the diversification-profitability relationship for leading UK and German firms during a period of critical importance, the implementation of the Single European Market (SEM). Although Grant et al. (1988) consider a large sample of UK firms from 1972 to 1984 and Buhner (1987) considers 40 large German firms from 1966 to 1981, neither study compares firms from both nations nor considers the transition period towards the SEM.

As well as adding diversity, part of the reason for choosing to study firms from these two EU member nations was pragmatic in that the data are extended from an earlier study (Davies et al., 1996) that looked at EU manufacturing as a whole for 1987. These earlier results showed that German firms in particular and UK firms accounted for a disproportionately large share of the EU's leading manufacturers. Moreover, UK firms tended to be the most multinational and diversified, whereas the converse was true for German firms. Thus, our second objective was to assess if there was any early evidence of "convergence" as markets became more integrated across the EU.

In addition, the authors are unaware of any other studies that analyze data at such a disaggregated level. For example, many studies of multinationality in particular are undertaken at the 2-digit industry level (Pain, 1996; Pain and Lansbury, 1997) and do not construct such a fine picture of the firm's operations. Thus, we present a uniquely constructed dataset which provides data at a disaggregated level on leading German and UK firms for the years 1987 and 1993. Moreover, although 1993 was the first full year of the SEM, firms had long anticipated the forthcoming and ongoing changes leading to the SEM and thus were far along the response path.

In Section 2, we set out our conceptual framework and discuss the links between product and geographic diversification and profitability. We start our analysis by considering the determinants of product and geographic diversification before going on to look at how such diversification might impact a firm's performance. In Section 3, we describe how our data were generated and provide descriptive statistics. Section 4 discusses the econometric methodology and our results. Finally, Section 5 offers concluding remarks.

2. Product and Geographic Diversification and Performance

2.1 Determinants of product diversification and multinationality

In our approach, we follow Markides (1995) who proposes that a firm has an equilibrium or desired level of diversification, D^*. This level varies between firms and over time, according to a vector of firm- and industry-level characteristics as discussed below. Furthermore, if firms are unable to instantaneously adjust their pattern of diversification to the optimal level due to adjustment costs, then over a given time period, we have $D_t - D_{t-1} = \lambda(D^* - D_{t-1})$, where λ represents the adjustment parameter, which may differ across Germany and the UK. If we suppose, à la Markides, that firms are converging to some optimum, we can analyze this econometrically by examining whether changing product or geographic diversification is inversely related to its initial level.

The first industry-level factor we consider is industry type. Recent advances in the industrial organization literature on the determinants of market structure have investigated the relationship between concentration and market size in various industries, where an industry typology was able to be constructed (Sutton, 1991, 1998; Lyons et al., 2001). The ideas developed in the analysis of market structure lend themselves well to the current work. Essentially, we expect there to be significant variation in how firms organize themselves across product and geographic space, according to whether they operate in industries characterized by vertical product differentiation. The basic theoretical notions are as follows.

In an industry where the product is essentially homogeneous (e.g., textiles, wood products), the key competitive weapon is price. Upon entering the market, firms must set up a plant of minimum efficient scale in order to be able to compete, but this tends to be the only fixed cost incurred. In other words, due to product homogeneity, there is little incentive to spend on endogenous fixed costs, as the firm is unable to increase consumers' willingness to pay. This industry type is termed Type 1.

In industries that are termed Type 2, on the other hand, firms not only incur the exogenous fixed cost associated with setting up a plant, but they also compete via endogenous fixed cost expenditures. What we mean by this is that firms can choose whether to engage in advertising and/or R&D in order to increase the perceived quality of their product and so increase consumers' willingness to pay. We define Type 2a industries as those in which firms compete in advertising as in the food, drink, and tobacco industries or in both advertising and R&D as in consumer durables and pharmaceuticals. We define Type 2r industries as industries in which firms compete in R&D only as in producer chemicals and engineering industries.

These industry types are important because in the strategy literature the specific assets that are most commonly argued to drive product diversification are exactly those that are associated with vertical product differentiation, i.e., advertising and/or R&D expenditures. We therefore expect the levels of product diversification to be

significantly positively correlated with firms that are operating in industries that we have characterized as Type 2.

However, inasmuch as our dataset spans an integrating market, we need to consider the different effects of advertising and R&D when considering geographic diversification. We propose that advertising does not extend easily across borders, due perhaps to differences in national media, cultural, and language barriers. On the one hand, firms need to locate close to the consumer, implying a positive correlation between firms operating in Type 2a industries and the degree of geographic diversification. On the other hand, inasmuch as firms undertake pan-European marketing campaigns, we would predict firms reorganize to achieve better exploitation of economies of scale and scope. As for R&D expenditures, we hypothesize that product improvements via R&D can generally be applied internationally with only slight local modification needed. Thus, we expect to see an inverse correlation between R&D and geographic diversification in response to the SEM as firms become more efficient in their R&D expenditures.

In Type 1 industries, by contrast, firms do not typically engage in advertising and/or product R&D expenditures, as the product is essentially homogeneous. Thus, the only fixed cost expenditures to consider are exogenous fixed costs. Given transport costs, as the initial capital outlays involved in setting up a plant of minimum efficient scale overseas increase, the profitability of overseas operations is reduced, which makes exporting more likely. Thus, whatever the industry type, the higher the degree of exogenous production economies of scale, the lower we expect the degree of multinational production to be. However, we expect this negative relation to be particularly pronounced in Type 1 industries.

The second industry characteristic we consider is the impact of the SEM, which had as its primary objective the elimination of the many non-tariff barriers (NTBs) to trade that had been erected in the stead of tariffs. The general expectation was that as more firms began to compete with one another, the increase in competition would put pressure on margins and lead to restructuring as the least efficient firms are forced to exit (Emerson et al., 1988). Indeed, EU merger and acquisition activity grew steadily throughout the 1980s, with a rapid acceleration between 1987 and 1990 (European Economy, 1996). However, not only has liberalization taken place in Europe, but major structural change is also occurring globally. For example, Markides (1995) reports that during the 1980s, for a sample of 219 US firms, a significant proportion reduced their diversification by refocusing on their core businesses, where such firms were typically characterized by low profitability and high diversification relative to industry rivals (see also Shleifer and Vishny, 1991; Davis et al., 1994). If the SEM program and globalization are increasing inter-firm competition and emphasizing the need to achieve scale economies to maintain profitability, then product diversified firms may be forced to concentrate on core industries in which they are large enough to compete and reduce their reliance on those peripheral activities in which they are not.

For geographically diversified firms, expectations are not so clear cut, as the cumulative findings of many scholars reveal (Rumelt, 1974; Berry, 1975; Geringer

et al., 1989; Tallman and Li, 1996; Hitt et al., 1997; Palich et al., 2000). On the one hand, as barriers to intra-EU trade and non-tariff barriers such as public procurement decline, the incentive to produce overseas lessens. On the other hand, local production may be necessary in some industries (e.g., for inherently non-tradable products, or where closeness to the consumers is necessary). Indeed, this may lead to increased multinationality, as firms attempt to compete over the entire EU or global market (Davies et al., 1999). In the period 1984–1992, intra-EU FDI flows increased from $3.2 billion to $58.7 billion (Pain, 1996), where the major recipient was the UK, receiving on average over 40% of extra-EU FDI flows and 14% of intra-EU trade flows between 1986 and 1992 (European Economy, 1996, p. 89).

Following the European Commission's 1990 evaluation of the manufacturing sector, we classify those industries which were predicted to be "sensitive" or "very sensitive" to the SEM, where the measures used included the level of non-tariff barriers, intra-EU trade, price dispersion of identical goods, and the potential for future exploitation of economies of scale. Firms operating in the "sensitive" industries are expected to face much greater changes in their competitive environments than firms operating within industries that were already more integrated in 1987.

Finally, we introduce some additional control variables into our regression equations. For example, we include the level of concentration in the firm's primary industry because if it is high, this constrains future growth, which in turn, makes the firm more likely to expand into other industries. We use national concentration in the estimation of product diversification and EU concentration in the estimation of geographic expansion. We also take account of firm size since it is often found that larger firms tend to be both more multinational and diversified. However, this observed positive relationship might be due to a purely arithmetic effect: if firms use diversification to avoid growth constraints, this must necessarily increase firm size, but the relationship is a near-identity rather than any causal one. This point is presented formally in Davies et al. (2001); using Berry's 1975 index, they show how aggregate firm size (*SIZE*) can be decomposed into 3 component parts: (i) typical market share (*MS*), (ii) typical industry size (*IS*), and (iii) the number of equivalent industries (countries) across which the firm operates (*D* or *M*). Holding the first two constant, it is shown that firm size must rise with diversification (*D*) or multinationality (*M*). Thus, to test the influence of firm size while controlling for the reverse arithmetic effect, we measure firm size net of diversification. Finally, our sample firms have increased both their manufacturing operations outside the EU and their operations outside manufacturing between 1987 and 1993. If the firm's corporate strategy is growth, in which the firm seeks to exploit some key specific asset, then we would expect a positive correlation between EU multinationality and their non-EU manufacturing operations, as well as between EU diversification and firm-level operations outside manufacturing.

2.2 Determinants of profitability

The relationship between firm performance and product and geographic diversification is not clear-cut. Various researchers have put forward compelling theoretical arguments for a positive link (e.g., Rugman, 1981; Porter, 1985; Hamel, 1991), but empirical results remain mixed and inconclusive (Hitt et al., 1997). Given the substantial weight of theory supporting both the benefits and potential costs of product and geographic diversification, our approach is to follow the predominant view in the literature (see for instance Palich et al., 2000) and propose that a firm's successful performance depends (nonlinearly) on its levels of diversification and multinationality.

The existing literature typically draws from both the resource-based theories of the firm originating in Penrose (1959), emphasizing the presence of firm-specific and internal resources (Montgomery, 1994; Markusen, 1995; Geringer, 2000; Hitt et al., 1997, Tallman and Li, 1996; Fladmoe-Lindquist and Tallman, 1994), and transactions cost theory (e.g., Teece, 1986). The resource-based view of the firm suggests that firms can maximize profits by fully leveraging their idiosyncratic and inimitable resources (Barney, 1991). In this view, the firm is seen as a collection of specific assets, where learning spillovers across product markets and spare capacity imply that product diversification should take place into industries that are related in the sense of requiring similar capabilities. At least initially, expansion into closely related product lines could be expected to improve firm performance by better exploiting economies of scale and scope.

However, the empirical evidence is mixed. Beginning with Rumelt's (1974) classic examination of related and unrelated product diversification, various researchers have explored the empirical impact of diversification on profitability and produced contradictory results (Berry, 1975; Christensen and Montgomery, 1981; Rumelt, 1982; Montgomery, 1985; Michel and Shaked, 1984; Grant et al., 1988). In particular, Grant et al. (1988) expound the inconclusive findings surrounding the performance-diversification relationship and provide an excellent summary of empirical studies that followed in the tradition of Rumelt (1974). See also Palich et al. (2000) for a more recent examination of over thirty years of research.

Given the huge and often conflicting literature, we argue that every firm has an optimal level of product and geographic diversification, à la Markides. Although there are benefits associated with diversification, there are also costs arising from potential organizational inefficiencies through the complexity of hierarchical structures increasing coordination costs, employee shirking (imperfect monitoring), and the costs of learning a new business. Eventually, the increased governance costs and weaker relationship to core operations outweigh the benefits of increased diversification (Tallman and Li, 1996; Jones and Hill, 1988). Due to these limits on managerial capabilities, we might expect to observe diminishing marginal returns in the relationship between firm performance and diversification (see also Rothaermel, 2001). In other words, we expect to observe an inverted-U shape.

Firms that diversify in geographic space have the opportunity to exploit factor price differences across markets (Porter, 1990) and to leverage strategic capabilities

and/or core competences across geographically dispersed units (Hamel, 1991; Bartlett and Ghoshal, 1989). Additionally, multinationality is an avenue through which many firms better exploit economies of scale (Kogut, 1985). According to the ownership-location-internalization framework (Dunning, 1981, 1988), gains from expanding multinational activity are likely to be linked to ownership advantages, such as managerial capability, reputation for quality, or patent possession; locational advantages such as differences in factor prices, tariffs, or access to resources; and internalization, which explains the incentive for the multinational to produce the product itself rather than licensing or forming some other arm's length relationship (e.g., Dunning, 1981; Caves, 1996).

Geringer et al. (2000) and Tallman and Li (1996) argue that management capabilities expand more or less equiproportionately with international expansion as suggested by internalization theory (Buckley, 1988), and so there is a positive linear relationship between firm performance and multinationality. However, notwithstanding the opportunities presented by expansion across national markets, increasing multinationality, analogously to increasing product diversification, raises the transactions costs to managers (Jones and Hill, 1988; Hitt et al., 1994) and is difficult to assess and coordinate (Roth et al., 1991; Hitt et al., 1997). Thus, we also propose that due to increasing governance costs, the performance-multinationality relationship is expected to be curvilinear rather than linear.

Interestingly, Hitt et al. (1997) also argue that the performance-multinationality relationship is positively moderated by the firm's diversification level. Their basic theoretical notion is that firms have built up managerial capabilities in product space that are then easily leveraged in geographic space, as well as having developed an appropriate organizational structure and better governance. This argument implicitly assumes that firms are sequential in their decision making, by first expanding in product space and then expanding in geographic space, an assumption that certainly warrants further investigation. Moreover, the key implication of this argument is that multinationality and diversification are complementary strategies. Kim et al. (1989) and Sambharya (1995) find empirically that the impact of product diversification on performance is contingent on the degree of multinationality. Caves (1996) provides a summary of the few empirical studies that have been undertaken, concluding that over time a firm can exploit both its product and geographic opportunities, where the types of proprietary assets that support geographic diversification tend to be the same ones associated with product diversification.

However, empirical results are mixed as to the joint influence of diversification and multinationality on performance. Indeed, rather than complementarity, it could be argued that it is equally as plausible that multinational operations and product diversification are substitutes, at least in the short-run. This is because there are constraints on growth resulting from semi-fixed managerial capacity and expertise. In other words, geographical expansion in a primary activity may be most efficiently achieved by reining back on peripheral product line activities in order to free up scarce managerial resources. Geringer et al. (2000) and Tallman and Li (1996) consider empirically the proposed negative relation between product diversification

and geographic diversification in terms of their joint impact on performance. In this paper, we attempt to assess whether diversification and multinationality are complementary or substitute strategies, a question that is rare in the existing empirical literature (see Davies et al., 2001).

3. Nature of the Data

Our unique database contains a sample of "leading" manufacturing firms from Germany and the UK, where a firm is defined as a leader if it was among one of the five largest producers in at least one 3-digit manufacturing industry in the EU in 1987, where the 3-digit level identifies industries such as "non-ferrous metals" or "bread and biscuits." The origins of the sample are found in a wider database, the 1987 EU matrix, which includes all (approximately 300) leading firms in the EU across the 100 3-digit industries that make up the manufacturing sector. Please see Davies et al. (1996) and Davies et al. (1999) for precise details on how the data were constructed.

Our database estimates each leading firm's sales sourced within the EU and its market share in all of the up to 100 3-digit manufacturing industries and all of the up to 12 member states in which the firm produces, as well as manufacturing outside the EU and sales outside the manufacturing sector. Thus, while the majority of firms are the industrial giants, aggregate size alone does not necessarily imply inclusion. The database includes some quite small firms that are leaders in relatively small specialist industries. In contrast with other empirical work, our sample provides extremely detailed and disaggregated information on each firm included. Thus, our initial sample is a set of 65 UK and 75 German firms that were leaders on the EU stage in 1987. For each firm, we construct a detailed disaggregated picture for both 1987 and 1993, straddling 1992. By 1993, the number of German firms was reduced to 69 and the number of UK firms was reduced to 57 due to acquisition.

To measure firm level profitability, we used firm accounts and Compustat® to construct various measures—return on sales, return on total assets (ROTA), and return on equity. Both return on sales and ROTA generated similar results and were highly correlated (r = 0.83); we used ROTA as the response variable. To smooth annual fluctuations, 1993 profitability was measured as the average of 1993 and 1994, and 1987 profitability was measured as the average of 1987 and 1988. We were able to construct profitability data for 53 firms in each country.

To measure the levels of diversification and multinationality, we use a Berry Entropy index defined as $D = -\sum p_k \ln p_k$, where p_k denotes the share of the firm's total sales produced in industry k. This index takes a lower value of zero if the firm is specialized in a single industry ($D = 1 \cdot \ln 1 = 0$) and an upper limit of $\ln k$ if the firm spreads its output equally across k industries ($D = -\sum (1/k) \ln (1/k) = \ln k$). Thus, larger values of D indicate higher levels of diversification, where the antilog of D can be interpreted as a number equivalent that can be compared across firms. The degree of a firm's multinationality is measured identically, replacing industries with member states. Thus, for a firm operating across a number of countries, its

index is $M = -\sum w_k \ln w_k$, where w_k is the proportion of the firm's total output produced in country *k*.

Table 1 shows the *D* and *M* indices and average profitability calculated for all surviving firms. Observe that profitability is lower on average for German firms and has decreased for both countries' firms between 1987 and 1993. Looking at 1987 firm size, German firms were somewhat smaller on average than the leading UK firms in terms of the geometric mean. In product space, this was because UK firms were more diversified. While they had slightly smaller typical market shares, this was largely offset by the fact that they tended to operate in larger industries. In geographic space, UK firms were more multinational within the EU.

Table 1. Profitability, Diversification, and Multinationality: Descriptive Statistics

		Mean	St. Dev.	Min.	Max.	*N*
Profitability						
German	*1993*	3.16	6.55	−16.15	17.16	53
	1987	7.61	5.25	−10.47	18.99	53
UK	*1993*	7.75	5.62	−6.91	22.89	53
	1987	11.89	5.03	1.83	30.33	53
Firm Size						
German	*1993*	1096.4	7375.5	24.8	40625.3	69
	1987	803.8	5278.8	21.0	24927.8	69
UK	*1993*	1029.2	2417.2	30.3	13445.4	57
	1987	1045.3	1957.6	37.9	10852.1	57
Firm Decomposition						
Diversification (D)						
German	*1993*	2.56	3.07	1.0	11.44	69
	1987	2.18	2.72	1.0	12.31	69
UK	*1993*	2.52	2.41	1.0	16.84	57
	1987	2.72	2.13	1.0	11.87	57
Market Share (MS) %						
German	*1993*	1.99	2.70	0.26	15.0	69
	1987	2.21	2.52	0.39	13.1	69
UK	*1993*	1.59	2.43	0.24	9.47	57
	1987	2.08	2.36	0.40	10.60	57
Industry Size (IS)						
German	*1993*	211.9	341.1	6.2	2035.5	69
	1987	166.2	287.9	7.8	1685.3	69
UK	*1993*	256.0	225.6	36.2	907.7	57
	1987	184.8	146.0	12.9	683.1	57
Multinationality (M)						
German	*1993*	1.50	0.69	1.0	4.16	69
	1987	1.29	0.51	1.0	3.27	69
UK	*1993*	1.79	1.04	1.0	4.72	57
	1987	1.52	0.88	1.0	4.56	57

Notes: Profitability is ROTA and Firm Size is the geometric mean of the firm's manufacturing production in the EU, measured in million ecus. All other estimates refer to the antilogs of the means of the logarithms of the variables: *D* and *M* are the entropy diversification and multinationality indices (calculated for the firm's operations within EU manufacturing), *MS* is the firm's typical market share (%), and *IS* is the typical size of industry in which the firm operates, measured in 100 million ecus.

Moving on to 1993, Table 1 shows that the 1987 diversification differential had been eliminated entirely, and the German firms were now slightly more diversified on average than their UK counterparts. Both countries' firms tended to lose EU market share during this period, but the UK loss was the more striking (−23.6% as opposed to −9.9%). Typical industry size increased for both countries' firms. Finally, both German and UK firms increased their intra-EU multinationality by about one-sixth, leaving the differential more or less unchanged. Thus, UK firms spread their 1993 EU manufacturing operations in a way that was equivalent to having equal-sized operations in 1.8 member states as opposed to 1.5 for the German firms.

Overall, the UK firms are considerably more dispersed (both geographically and in product space) than their German counterparts; there is definite evidence of increased (extra-EU) multinationality in both countries, but no evidence of manufacturers returning to a manufacturing core. However, these results are descriptive only, and we now turn to our econometric results to better explain the link between profitability, diversification, and multinationality.

4. Econometric Methodology and Results

We propose the existence of an equilibrium level of diversification (multinationality) to which all firms will tend to gravitate over time. If such an equilibrium exists, and it is broadly similar across the two countries, then "convergence" might be said to occur. Empirically, the implication is that initially highly diversified firms will tend to reduce their diversification, while more specialist firms might increase theirs. This is tested via a partial adjustment model, where changing diversification (multinationality) is inversely related to its initial level. Thus, the regressions are run with the 1993 values of the *D* or *M* index, including the 1987 values as explanatory variables. Algebraically, this is equivalent to regressing the change in *D* or *M* on its initial value, where a coefficient less than unity is equivalent to finding a negative influence for the initial level on the change. We specify and estimate the empirical models below:

$$D_{ijt} = \beta_1 + \beta_2 D_{ijt-1} + \beta_3 INDTYPE + \beta_4 SEM + \beta_5 Z + u_{ijt}, \quad (1)$$

where D_{ijt} measures the level of product diversification of firm *i* in country *j* at time *t*, D_{ijt-1} measures the initial level of diversification, *INDTYPE* measures the industry type, *SEM* represents the expected sensitivity of the firm to the Single European Market program and *Z* is a vector of control variables. Secondly, we estimate:

$$M_{ijt} = \beta_1 + \beta_2 M_{ijt-1} + \beta_3 INDTYPE + \beta_4 SEM + \beta_5 Z + u_{ijt}, \quad (2)$$

where M_{ijt} measures the multinationality of firm *i* in country *j* at time *t*, M_{ijt-1} measures the initial level of multinationality, and *INDTYPE*, *SEM*, and *Z* are as explained above.

We estimated Equations (1) and (2) via OLS and Tobit, where the results are reported in Tables 2 and 3. Tobit was also used as an estimation procedure because a key feature of the response variable is that it is bounded below by zero, with a substantial number of zero observations (i.e., firms that manufacture single products or in one member state only). Using OLS may bias our estimates towards zero, and estimation via Tobit corrects for this. However, it turns out that the results are similar, and so we discuss only the OLS results.

Table 2 shows that, as expected, 1993 diversification is strongly correlated with initial diversification levels for both Germany and the UK. Importantly, the change in diversification is negatively related to its initial level, which is consistent with a tendency towards some sort of equilibrium level in both countries.

Table 2. Determinants of Product Diversification in Leading German and UK Firms: Response Variable is 1993 Diversification (EU)

	Germany	**Germany (Tobit)**	**UK**	**UK (Tobit)**
Predictor Variable	**Diversification 1993**	**Diversification 1993**	**Diversification 1993**	**Diversification 1993**
Constant	−0.288 (0.191)	−0.494 (0.390)	−0.544 (0.446)	−1.092 (0.558)+
1987 Diversification	0.888 (0.050)**	0.942 (0.058)**	0.691 (0.100)**	0.766 (0.101)**
Firm Size	0.009 (0.024)	0.015 (0.036)	−0.146 (0.268)*	−0.157 (0.066)*
Industry Growth	0.070 (0.191)	0.390 (0.318)	0.477 (0.268)+	0.550 (0.319)+
Type 2a	−0.245 (0.091)**	−0.332 (0.114)**	−0.172 (0.112)	−0.233 (0.153)
Type 2r	−0.115 (0.087)	−0.147 (0.102)	0.271 (0.125)*	0.305 (0.141)*
SEM	0.137 (0.080)+	0.106 (0.179)	0.055 (0.138)	0.070 (0.179)
Prod. Outside Manuf.	0.713 (0.184)**	0.887 (0.256)**	0.074 (0.141)	0.142 (0.200)
Ind. Concentration	0.057 (0.070)	0.132 (0.101)	0.393 (0.142)**	0.513 (0.155)**
N	69	69	57	57
R^2	0.891	0.737 (Pseudo R^2)	0.632	0.457 (Pseudo R^2)
F	61.21**		10.29**	
χ^2	20.25**		13.84+	
Log-L		−23.907		−33.125

Notes: Values in parentheses are standard errors (using White's correction for heteroscedasticity) and +, *, and ** indicate significance at the 10%, 5%, and 1% level.

Looking at industry type, we observe a uniformly negative correlation if the industry is advertising-intensive, which is significant for German firms. This implies that there was a tendency for diversification to increase least for German firms operating in markets characterized by vertical product differentiation as compared to firms operating in Type 1 industries. For UK firms, the results also indicate a

significant and positive correlation between product diversification and Type 2r industries, implying these firms were exploiting their firm-specific assets across R&D intensive industries as compared to Type 1 industries. The impact of the SEM is significant for German firms only (although consistently positive) implying that firms had increased their product diversification between 1987 and 1993 in response to the SEM.

As for our control variables, we expected that larger firms would tend to be more diversified. Although we observe a positive coefficient in firm size for German firms, it is not significant. Interestingly, we observe a negative correlation between 1993 diversification levels and firm size for the UK firms, indicating that large UK firms were more likely to de-diversify over the time period. We also observed a positive correlation between primary industry concentration and diversification, this correlation being significant for UK firms. Finally, German firms showed tendencies to increase their diversification levels if they also had extensive non-manufacturing operations.

Table 3 reports our results on multinationality. As expected, we find that the change in multinationality is significantly negatively related to its initial level, which is consistent with a tendency towards some sort of equilibrium level in both countries. We also observe a significant negative relationship between minimum efficient scale and the degree of firm-level multinationality, showing that the greater the degree of exogenous fixed costs, the less likely it is for a firm to set up production in overseas markets. Moreover, the higher the industry concentration and the larger the firm (especially for German firms), the more likely it is that the firm will expand in geographic space. The results on production outside the EU show that those firm-specific assets that lend themselves to intra-EU manufacturing can also be exploited in other geographic markets.

Looking at industry type, we note that firms that are operating in advertising-intensive industries tended to reduce their multinational activity as compared to Type 1 industries. This may be because the levels of multinationality were already high as compared to Type 1 firms, so Type 1 firms were increasing their multinationality more rapidly. The result might also reflect a move towards greater efficiency in advertising expenditures. As for R&D intensive industries, the results are as predicted in that firms reorganized their R&D to reflect the move to the integrated market. Given exogenous economies of scale dictating production choices, firms located their R&D labs wherever it was efficient to do so, and we would not expect to observe the duplication of costly R&D activities unless firms are forced by demand to customize their products. Finally, our results on sensitivity to the SEM show a stark contrast across the two countries. For Germany, the significantly negative coefficient implies that German firms may have located in certain member states before 1987 in order to circumvent any NTBs but have since increased their multinational operations less rapidly than other firms in less sensitive industries. The positive (though less statistically significant coefficient) for UK firms suggests that these firms may have had different original or response growth strategies.

Table 3. Determinants of Geographic Diversification in Leading German and UK Firms: Response Variable is 1993 Multinationality (EU)

	Germany	Germany (Tobit)	UK	UK (Tobit)
Predictor Variable	**Multinationality 1993**	**Multinationality 1993**	**Multinationality 1993**	**Multinationality 1993**
Constant	−0.375 (0.110)**	−0.744 (0.220)**	−0.626 (0.281)*	−0.942 (0.411)*
1987 Multinationality	0.708 (0.112)**	0.732 (0.113)**	0.696 (0.120)**	0.757 (0.122)**
Firm Size	0.043 (0.019)*	0.074 (0.027)**	0.044 (0.035)	0.054 (0.049)
Industry Growth	0.284 (0.126)*	0.424 (0.189)*	0.435 (0.162)**	0.430 (0.226)+
Type 2a	−0.075 (0.069)	−0.111 (0.084)	−0.283 (0.112)*	−0.303 (0.123)*
Type 2r	−0.128 (0.073)+	−0.167 (0.080)*	−0.231 (0.123)+	−0.269 (0.151)+
SEM	−0.248 (0.048)**	−0.497 (0.177)**	0.208 (0.081)*	0.238 (0.111)*
Prod. Outside the EU	0.754 (0.322)*	0.869 (0.302)**	0.434 (0.228)+	0.562 (0.219)*
Min. Efficient Scale	−0.0003 (0.0001)*	−0.0004 (0.0002)*	−0.0015 (0.0006)*	−0.0014 (0.0007)*
Ind. Concentration	0.086 (0.045)+	0.111 (0.060)+	0.167 (0.095)+	0.194 (0.107)+
N	68	68	56	56
R^2	0.745	0.862 (Pseudo R^2)	0.681	0.547 (Pseudo R^2)
F	18.87**		10.92**	
χ^2	24.69**		21.02*	
Log-L		−7.406		−24.81

Notes: Values in parentheses are standard errors (using White's correction for heteroscedasticity) and +, *, and ** indicate significance at the 10%, 5%, and 1% level. The number of observations is reduced to N = 68 for Germany and N = 56 for the UK due to missing observations on concentration in the firm's primary industry.

Now consider profitability and diversification where we specify the basic empirical relation to be estimated as follows:

$$\Pi_{ijt} = \beta_1 + \beta_2 D_{ijt} + \beta_3 D_{ijt}^2 + \beta_4 M_{ijt} + \beta_5 M_{ijt}^2 + \beta_6 D_{ijt} \cdot M_{ijt} + \beta_7 Z + u_{ijt}. \qquad (3)$$

Following our theoretical discussion in Section 2, we expect to observe positive coefficients for β_2 and β_4 and negative coefficients for β_3 and β_5. However, our ex ante expectations for β_6 are not clear-cut. On the one hand, if firms can easily leverage their managerial capabilities across both product and geographic space, then we would expect β_6 to be significantly positive, but if there are constraints on (semi-fixed) managerial capabilities, then we would expect β_6 to be negative. Following Sambharya (1995), Tallman and Li (1996), and Geringer et al. (2000), we

define our interaction variable, $D_{ijt} \cdot M_{ijt}$, as the product of the two indices of diversification and multinationality.

We report our results in Table 4 below, where we approached our estimation in several ways. First, we estimated a linear relation between profitability, diversification, and multinationality to give us our benchmark results (columns 1 and 4). In addition, some of the studies discussed in Section 2 found empirically that this was the best econometric specification for their data. Second, we estimated Equation (3) above, where the results are reported in columns 2 and 5. Consider column 2; interestingly, the signs on Multinationality and Multinationality^2 are both negative for Germany. This suggests the data do not fit well with the nonlinear functional form but rather that the relation between profitability and multinationality is linear in nature, which yields our final specification for Germany as reported in column 3. Next consider column 5; the coefficient signs on Diversification and Diversification^2 are uniformly positive for the UK. This suggests a linear rather than nonlinear relation, and yields our final specification for the UK as reported in column 6. Thus, we discuss the results as reported in columns 3 and 6 below.

Taking the German results first, the data suggest a curvilinear relationship between performance and product diversification, although it is never significant. However, the data suggest a linear rather than a curvilinear relationship between profitability and multinationality, moreover, the relationship is (weakly) significantly negative. Interestingly, diversification and multinationality are found to be complementary strategies in that joint high levels increase the performance of the firm.

Considering our control variables, profitability is positively linked to changes in demand, indicating that a rapid growth rate may increase profit margins through maintaining pressure on capacity (Hay and Morris, 1991). Also, in industries expected to be sensitive to the SEM, we note the negative correlation, indicating that incumbent firms are no longer as protected and thus are facing pressure on their margins. Firms that had increased their operations outside the EU saw increased profitability. Finally, although firms operating in Type 2a industries saw no change in profitability as compared to firms in Type 1 industries, firms operating in Type 2r industries saw a decrease in profitability. Given that German firms were traditionally strong in such industries, this implies that firms were facing an increase in competitive pressure.

Looking now at UK firms, note the important and significant cross-country differences. Unlike our German firms, there was no evidence of a curvilinear relation between performance and product diversification but instead between performance and multinationality. Both product and geographic diversification were significantly and positively correlated with performance. In contrast with German firms, diversification and multinationality are found to be substitute strategies in that joint high levels appeared to have a negative influence on profitability.

One possible ex post explanation lies in the differences in corporate governance. Broadly speaking, in Germany, large banks use a combination of direct ownership,

representation on supervisory boards, and debt that allows a more long-term view of investment and return. The external market for corporate control plays a small role.

Table 4. Determinants of Profitability in Leading German and UK Firms: Response Variable is Return on Total Assets

		Germany			*UK*	
	Column 1	**Column 2**	**Column 3**	**Column 4**	**Column 5**	**Column 6**
Predictor Variable	**Linear**	**Nonlinear**	**Final**	**Linear**	**Nonlinear**	**Final**
Constant	1.386	0.166+	0.778	−2.940+	−1.994	−3.206*
	(2.873)	(2.987)	(2.936)	(1.480)	(1.388)	(1.390)
Diversification (EU)	−2.857	0.491	0.785	6.634**	2.430	6.589**
	(2.055)	(4.035)	(4.006)	(2.349)	(2.958)	(2.378)
Diversification^2		−1.662	−1.603		2.316**	
		(1.527)	(1.562)		(0.857)	
Multinationality (EU)	−5.765+	−2.214	−6.463+	7.619**	10.781**	9.536*
	(3.421)	(6.331)	(3.418)	(2.685)	(3.744)	(3.941)
Multinationality^2		−3.967			−1.777	−1.411
		(4.378)			(2.312)	(2.306)
D-M Interaction	6.038*	6.818*	6.292*	−6.420*	−7.757**	−6.476*
	(2.848)	(2.889)	(2.812)	(2.961)	(2.623)	(2.946)
Industry Growth	16.833**	16.012**	16.112**	5.800+	6.868*	6.172+
	(3.582)	(3.380)	(3.289)	(3.086)	(3.038)	(3.222)
Type 2a	−1.533	−1.536	−1.621	2.245	1.821	2.154
	(2.245)	(2.286)	(2.259)	(1.354)	(1.405)	(1.392)
Type 2r	−2.505	−2.839	−2.910+	−1.052	−0.982	−1.14
	(1.725)	(1.756)	(1.723)	(1.685)	(1.657)	(1.697)
SEM	−5.500**	−5.262*	−5.613**	3.400*	3.130*	3.428*
	(1.992)	(2.200)	(1.921)	(1.293)	(1.293)	(1.289)
ΔProd. Outside the EU	23.988**	24.636*	25.076*	−0.784	−0.741	−1.209
	(8.469)	(9.822)	(9.309)	(3.881)	(3.742)	(3.769)
ΔSales Outside Manuf.	21.314	23.260	19.234	6.039+	8.496+	6.417+
	(13.579)	(15.506)	(13.290)	(3.474)	(3.499)	(3.519)
N	53	53	53	53	53	53
R^2	0.370	0.392	0.385	0.499	0.539	0.501
F	2.80*	2.41*	2.63*	4.75**	4.37**	4.21**
χ^2	16.41+	18.38+	18.85*	17.06*	17.58+	17.82+

Notes: Values in parentheses are standard errors (using White's correction for heteroscedasticity) and +, *, and ** indicate significance at the 10%, 5%, and 1% level. The number of observations is reduced to $N = 53$ for both Germany and the UK due to missing observations on the response variable.

In the Anglo-American model, on the other hand, individual stakeholders have little direct influence on management, and dispersed ownership implies any necessary remedial action is taken by selling shares. Such differences in corporate governance may explain differences in firms' reactions to the pressures of the SEM, including the speed of response. Future research might consider the possibility suggested by the work of Khanna and Rivkin (2001), rooted in DiMaggio and Powell (1983), that these opposite effects reflect a move to a more uniform pan-European structure.

We also observe the positive impact of industry growth on UK firm performance. However, the impact of the SEM has been to increase rather than to

reduce profitability, perhaps suggesting that UK firms are quickly moving into other countries' markets that were hitherto difficult to enter due to some form of NTBs. Finally, firm-level profitability was not affected by industry type (as compared to Type 1 industries), but firms that had made an early move into service sectors saw an increase in their profitability.

5. Concluding Remarks

Our study complements existing research on the performance-diversification debate. Using uniquely disaggregated data, we do not find strong evidence of a curvilinear relationship between profitability and either multinationality or diversification. To the contrary, the data suggest a linear relationship, indicating that diminishing marginal returns may not have as strong an impact as has been argued in the recent strategy literature (Hitt et al., 1997; Geringer et al., 2000; Rothaermel, 2001). In addition, our results stress the importance of the national market. Thus, for UK firms, our results indicate that multinationality and diversification are substitute strategies, whereas the converse is found for German firms implying that more research needs to be undertaken using diverse samples. We also find some evidence of country effects in that the liberalization that followed from the move to the Single European Market had significant but opposite effects on German and UK firms.

Our final but perhaps most intriguing results concern the relationship between the endogenous investments that comprise the bases for competition across firms (i.e., advertising and R&D) and diversification. Investments made by firms in Type 2a industries are associated with less diversification, whereas the converse is true for Type 2r firms. When considering multinationality, we find uniformly inverse correlations between industry type and the degree of multinationality. These results may reflect different starting points for the firms under consideration but certainly warrant further investigation.

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